DOCUMENT RESUME

ED 395 797 SE 058 392

AUTHOR	Tittle, Carol Kehr; Pape, Stephen
TITLE	Selected References for Assessment and Evaluation of Mathematics and Science Teaching Reforms in Classrooms: A Bibliography.
INSTITUTION	City Univ. of New York, N.Y. Center for Advanced Study in Education.
REPORT NO	CASE-09-95
PUB DATE	Sep 95
NOTE	32p.
AVAILABLE FROM	Center for Advanced Study in Education, City University of New York, Graduate School and University Center, 33 W. 42nd Street, New York, NY 10036.
PUB TYPE	Reference Materials - Bibliographies (131)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Classroom Communication; *Educational Assessment; *Educational Change; Elementary Secondary Education; *Mathematics Education; Mathematics Teachers; Observation; *Science Education; Science Teachers; Students
IDENTIFIERS	*Reform Efforts

ABSTRACT

The reform of mathematics and science teaching and learning in school classrooms has been underway for the past two decades. A review of the literature performed on the ERIC CD ROM system yielded a selected bibliography of 154 items identifying several areas of current activity that are included in research and development projects focused on reform in science and mathematics. The references encompass papers of a general or theoretical interest on assessment and evaluation, including studies and case studies. Particular attention has been paid to studies of classroom discourse, classroom observation tools, and the beliefs and knowledge of teachers and students. The last section is devoted to studies of assessment of teachers, of students, and of teacher use of assessments. Included is a list of ERIC literature search strategies and the number of ERIC documents located for each search. (MKR)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 395 797

Selected references for assessment and evaluation of mathematics and science teaching reforms in classrooms
A Bibliography

Carol Kehr Tittle, Ph D

Stephen Pape

Graduate School and University Center
City University of New York

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

B. Flanagan

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Center for Advanced Study in Education
The Graduate School and University Center
of the City University of New York
33 West 42 Street, New York, N.Y. 10036

CASE # 09-95
September 1995

BEST COPY AVAILABLE

SELECTED REFERENCES FOR ASSESSMENT AND EVALUATION OF MATHEMATICS AND SCIENCE TEACHING REFORMS IN CLASSROOMS A BIBLIOGRAPHY

Introduction

The reform of mathematics and science teaching and learning in school classrooms has been underway for the past two decades. These efforts to change teaching practice and learning outcomes have a number of goals, some of which are articulated in standards documents of the National Council of Teachers of Mathematics -- the Curriculum and evaluation standards for school mathematics (1989), the Professional standards for teaching mathematics (1991), and the Assessment standards for school mathematics (1995). Other standards are those of the National Research Council, the National science education standards (1994, November, Draft). Both the science standards and those for mathematics include recommendations about teaching, the professional development of teachers of science and mathematics, and assessment of students

These documents encourage a view of students as active participants in the learning process--problem solving and conducting scientific inquiries, of teachers facilitating student development in a particular subject matter, and of teachers themselves actively developing and reflecting on classroom practice. Other key ideas are those represented by suggestions of communities of learners, with shared agreements between teacher and students about the nature of discourse on mathematical and scientific problems, about evidence, explanation, justification, and so on. Teachers are encouraged to use groups for mathematical problem solving and for "hands-on" science investigations to foster student understanding of mathematics and science

The vision of mathematics and science classrooms embodied in the standards and reform documents provide several challenges: to models of teacher development, to projects such as those funded by federal agencies and foundations, and to evaluators. Little (1993) argues that there is a lack of fit among existing models of teacher professional development and reform visions. That is, there is a lack of fit between the dominant training-and-coaching professional development model--a model focused on "expanding an individual repertoire of well-defined and skillful classroom practice" (p. 129), and the reforms, for example, in subject matter teaching (standards, curriculum and pedagogy).

Federally-funded projects, such as the Urban Systemic Initiatives and Teacher Enhancement Projects of the National Science Foundation (e.g., Stake, et al., 1993), and foundation-funded projects, such as the Urban Mathematics Collaboratives and QUASAR projects of the Ford Foundation, are responding to the challenge to encourage professional development and to develop alternatives to existing in-service teacher education programs and to the isolation of individual teachers in their classrooms.

Similarly, these standards and alternative visions of teachers in interaction with students in classrooms pose challenges to evaluation, both methodologically (e.g., Frechtling, 1995) and substantively (Stake et al., 1993). From an evaluation perspective, an important aspect of the challenge can be defined more specifically: the major challenge is describing and documenting teaching practice that is related to the reform visions for classrooms.

Bibliography

This selected bibliography identifies several areas of current activity that are included in research and development projects focused on reform in science and mathematics. The references encompass papers of a general or theoretical interest, and about evaluation--including studies and case studies. Particular attention has been paid to studies of classroom discourse and classroom observation tools, and to beliefs and knowledge--of teachers and of students. The last section is concerned with studies of assessment--of teachers, of students, and of teacher use of assessments, that is, of teacher assessment practice in classrooms. Table 1 lists the categories of the bibliography and the number of citations in each category.

Table 1. Bibliography categories and numbers of references

Category		Number of References
A.	Theoretical/General Background	
	1. Reform, Standards and Status	14
	2. Constructivist/Inquiry Teaching and Learning	11
	3. Other	7
B.	Evaluation	
	1. General	8
	2. Evaluation Studies	11
	3. Evaluation Case Studies	6
C.	Classroom Discourse Analysis	16
D.	Classroom Observational Tools	6
E.	Beliefs and Knowledge	
	1. Teacher Beliefs	19
	2. Student Beliefs	5
F.	Assessment	
	1. Teacher Assessment	19
	2. Student Assessment	24
	3. Teacher Assessment Practices	8

Of particular interest in evaluations of reform classrooms are descriptions of classroom communication, activities, and tasks. The studies identified in analyses of classroom discourse and classroom observation tools in mathematics and science teaching are those which attempt to describe what teaching for understanding means. This meaning is displayed in patterns of teacher-student and student-student communication, characteristic of activities, and in the knowledge and beliefs held about science and mathematics teaching and learning by teachers and students.

The selected bibliography is limited by the terms of the search procedures used and by the decision to emphasize recent work on discourse and knowledge and beliefs in the areas of science and mathematics. The search procedures are described below. These are followed by the bibliography presented in two formats: by category and by author, alphabetically. Presenting a separate listing by author facilitates the location of particular individuals whose works may have been placed in several categories.

Literature Search Procedures

A review of the literature was performed. This search was executed on the ERIC CD ROM system and occurred in several stages. First, descriptors for science or mathematics activities and programs were combined with those for instructional effectiveness, teacher education, or evaluation. For example, a sample of the searches performed in science include (1) science activities or programs AND instructional or program effectiveness or student development, (2) sciences AND teacher education or inservice teacher education, (3) evaluation AND science education, (4) evaluation AND science instruction or science teachers. Second, teacher and student belief descriptors were combined with science and mathematics education. Third, student attitudes in science or mathematics were combined with evaluation descriptors. Fourth, mathematics or science teachers was combined with discourse and interaction analysis. Finally, protocol materials and urban programs were entered separately. A listing of searches including search terms and the number of ERIC documents located for each search is given in Table 2.

Table 2. List of literature searches and number of references located

1.	[science activities OR science programs] AND [outcomes OR instructional effectiveness OR program effectiveness OR student development]	08
2.	[teacher education OR inservice teacher education] AND [sciences]	09
3.	science attitudes AND science concepts	15
4.	beliefs AND science education	40
5.	[outcomes OR instructional effectiveness OR program effectiveness OR student development] AND [sciences OR science attitudes OR inquiry OR science concepts]	23
6.	evaluation AND science activities	18
7.	evaluation AND [science OR science instruction OR science teachers]	96
8.	evaluation AND [science attitudes OR inquiry]	06
9.	evaluation AND [science concepts OR science programs OR science teach]	33
10.	{evaluation AND [teacher education OR inservice teacher education]} AND [science concepts OR science programs OR science teachers]	14
11.	evaluation AND {[science act OR science education OR science programs] AND [teacher education OR inservice teacher education]}	29
12.	{[outcomes OR instructional effectiveness OR program effectiveness OR student development] AND [science teachers, teacher education OR science education]} AND evaluation	33
13.	evaluation AND [math OR math instruction OR math teachers]	114
14.	[discourse analysis/interaction analysis] AND [science education/science teacher]	14
15.	[teacher/student behavior] AND [classroom observation/behavior] AND [science education/teacher]	10

16	[discourse analysis/interaction analysis] AND [math education/math instruction]	09
17	[discourse analysis/interaction analysis] AND [math education] AND [teacher/student behavior]	04
18	[teacher/student behavior] AND [classroom observational tech] AND [math education]	28
19	protocol materials	03
20	USI (in whole ERIC entry)	01
21	(urban systemic initiative) in AB	01
22	urban programs/urban improvement	38
23	[evaluation/instructional material evaluation/educational assess] AND [math/math instruction/math teachers]	269

BIBLIOGRAPHY LISTING BY CATEGORY

Categories: A = Theoretical/General, B = Evaluation, C = Classroom Discourse, D = Observation Tools, E = Beliefs & Knowledge, F = Assessment

A Theoretical/General Background/Reform in Mathematics and Science Classrooms

1 Reform, Standards and Status

Mitchell, I. (1994). School-tertiary collaboration: A long-term review. International Journal of Science Education, 16, 599-612.

National Academy Press (1994, November). National science education standards (DRAFT). Washington, DC: Author.

National Council of Teachers of Mathematics (1989). Curriculum and evaluation standards for school mathematics. Reston, VA: Author.

National Council of Teachers of Mathematics (1991). Professional standards for teaching mathematics. Reston, VA: Author.

National Council of Teachers of Mathematics (1995). Assessment standards for school mathematics. Reston, VA: Author.

Page, R. (1995). Who systematizes the systematizers? Policy and practice interactions in a case of state-level systemic reform. Theory into Practice, 34, 21-29.

Porter, A. (1993, May). Defining and measuring opportunity-to-learn. Paper prepared for the National Governors' Association. Madison, WI: Center for Policy Research in Education and the Wisconsin Center for Education Research.

Porter, A. (1994, May). The uses and misuses of opportunity-to-learn standards. Paper presented at a Brookings Institution conference, Beyond Goals 2000: The Future of National Standards and Assessment in American Education, Washington, DC.

Porter, A. C. (1995, April). Standard setting and the reform of high school mathematics and science (DRAFT). Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Porter, A. C., Smithson, J., & Osthoff, E. (1994). Standard setting as a strategy for upgrading high school mathematics and science. The governance of curriculum: The 1994 ASCD Yearbook (pp. 138-166). Alexandria, VA: Association for Supervision and Curriculum Development.

Smithson, J. L., & Porter, A. C. (1993, April). Measuring classroom practice: Lessons learned from efforts to describe the enacted curriculum - The Reform-Up-Close study. Paper presented at the Annual meeting of the American Educational Research Association, Atlanta, GA.

Smithson, J. L., Porter, A. C., & Blank, R. K. (1995, May). Describing the enacted curriculum: Development and dissemination of opportunity to learn indicators in science education. Washington, DC: Council of Chief State School Officers.

Stocks, J. E., & Schofield, J. W. (in press). Educational reform and professional development. In E. Fennema & B. S. Nelson (Eds.), Teachers in transition.

Weiss, I. (1993). A profile of science and mathematics education in the United States: 1993. Chapel Hill, NC: Horizon Research.

2. Constructivist/Inquiry Teaching and Learning

Cobb, P., & Yackel, E. (1995, April). A constructivist perspective on the culture of the mathematics classroom. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Cohen, M. R., & Harper, E. T. (1991). Student-as-scientist and scientist-as-student: Changing models for learning from experience. Teaching Education, 3, 31-40.

Davis, R. B. (1994). The task of improving mathematics classrooms: A reply to Schofield, Eurich-Fulcer, and Britt. American Educational Research Journal, 31(3), 608-618.

Kinnear, J. (1994). What science education really says about communication of science concepts. Paper presented at the International Communication Association Conference, Sydney, Australia. (ERIC Document Reproduction Service No. ED 372 455)

Peterson, P. L., & Fennema, E. (1991, October). Mathematics teaching and learning: Researching in well-defined mathematical domains. Elementary Subjects Center Series No. 40. Proceedings of a Conference held at Michigan State University, East Lansing, MI: The Center for the Learning and Teaching of Elementary Subjects, Institute for Research on Teaching.

Simon, M. A. (1994). Learning mathematics and learning to teach: Learning cycles in mathematics teacher education. Educational Studies in Mathematics, 26, 71-94.

Simon, M. A. (1995a). Elaborating models of mathematics teaching: A response to Steffe and D'Ambrosio. Journal for Research in Mathematics Education, 26, 160-162.

Simon, M. A. (1995b). Reconstructing mathematics pedagogy from a constructivist perspective. Journal for Research in Mathematics Education, 26, 114-145.

Steffe, L. P., & D'Ambrosio (1995). Toward a working model of constructivist teaching A reaction to Simon. Journal for Research in Mathematics Education, 26, 146-159.

Williams, S. R. (1993). Mathematics and being in the world: Toward an interpretive framework. For the Learning of Mathematics, 13, 2-7.

Yackel, E., & Cobb, P. (1992). Instructional development and assessment from a socioconstructivist perspective. In G. C. Leder (Ed.), Assessment and learning of mathematics (pp. 63-82). Victoria, Australia: The Australian Council for Educational Research.

3 Other

Falmagne, J. C., Doignon, J. P., Koppen, M., Villano, M., & Johannesen, L. (1990). Introduction to knowledge spaces: How to build, test, and search them. Psychological Review, 97, 201-224.

Goldsmith, L. T., & Davenport, L. R. (1995, April). Affective issues in developing mathematics teaching practice. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Kilgore, S. B., & Pendleton, W. W. (1993). The organizational context of learning: Framework for understanding the acquisition of knowledge. Sociology of Education, 66, 63-87.

Knapp, N., & Peterson, P. L. (Eds.) (1993). Understanding learners' understandings. Elementary Subjects Center Series No. 97. East Lansing, MI: Center for the Learning and Teaching of Elementary subjects. (ERIC Document Reproduction Service ED 356 900)

Little, J. W. (1993). Teachers' professional development in a climate of educational reform. Educational Evaluation and Policy Analysis, 15, 129-151.

Machiels-Bongaerts, M., & Schmidt, H. G. (1995). The relation between the nature of prior knowledge activated and information processing: To elaborate or to infer? Unpublished manuscript. Maastricht, The Netherlands: Universitaire Pers Maastricht.

Schofield, J. W., Eurich-Fulcer, R., & Britt, C. L. (1994). Teachers, computer tutors, and teaching: The artificially intelligent tutor as an agent for classroom change. American Educational Research Journal, 31, 579-607.

B. Evaluation

1. General

Altschuld, J. W., & Kumar, D. (1995). Program evaluation in science education: The model perspective. New Directions for Program Evaluation, 65, 5-17.

Frechtling, J. A. (1995). Footprints: strategies for non-traditional program evaluation. Rockville, MD: Westat.

Freeman, J. G., Kelly, B. A., & Marx, R. W. (1995, April). Helping teachers adopt a constructivist approach to teaching science. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Hojnacki, S. K., & Grover, B. W. (1992, April). Thinking mathematics: What's in it for the students? Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Kagan, D. M. (1990). Ways of evaluating teacher cognition: Inferences concerning the Goldilocks Principle. Review of Educational Research, 60, 419-470.

Koretz, D., & Stecher, B., Klein, S., McCaffrey, D., & Deibert, E. (1992). Can portfolios assess student performance and influence instruction? The 1991-92 Vermont experience. Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing. (ERIC Document Reproduction Service No. ED 365 699)

Lewin, A. (1992). The Shell Science Center: In Inset 1990. Durban, South Africa: The Shell Science and Mathematics Resource Centre Education Trust.

O'Sullivan, R. (Ed.) (1995). Emerging roles of evaluation in science education reform (whole issue). New directions for program evaluation, 65.

2. Evaluation Studies

ABT Associates (1993). A study of NSF Teacher Enhancement Program (TEP) participants and principal investigators: 1984-1989. Volume II: Technical report. Cambridge, MA: Author. (ERIC Document Reproduction Service No. ED 372 027)

Bearden, D., Bembry, K., & Babu, S. (1995, April). Effective schools: Is there a winning combination of administrators, teachers and students? Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Blume, B. W., & Nicely, R. F. (Eds.) (1991). A guide for reviewing school mathematics programs. Reston: VA: National Council of Teachers of Mathematics. (ERIC Document Reproduction Service ED 339 597)

Cobb, P., Wood, T., Yackel, E., & Perlwitz, M. (1992). A follow-up assessment of a second-grade problem-centered mathematics project. Educational Studies in Mathematics, 23, 483-504.

Doolittle, G. (1995, April). How seventh and eighth grade students experience hands-on science in the urban core. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Freeman, J. G., Kelly, B. A., & Marx, R. W. (1995, April). Helping teachers adopt a constructivist approach to teaching science. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Hojnacki, S. K., & Grover, B. W. (1992, April). Thinking mathematics: What's in it for the students? Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Kirkpatrick, N., Tullis, R. J., Sanchez, K. S., & Gonzalez, J. (1991). 1990-91 HISD Magnet Evaluation: Science, math, and computer enrichment programs. Houston, TX: Houston Independent School District, Research & Evaluation Office. (ERIC Document Reproduction Service ED 347 068)

Lewin, A. (1992). The Shell Science Center: In Inset 1990. Durban, South Africa: The Shell Science and Mathematics Resource Centre Education Trust.

McMullen, B. G. (1993). Quantitative analysis of effects in the classrooms. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA. (ERIC Document Reproduction Service No. ED 358 116)

Middleton, J. A., Pitman, A., & Webb, N. L. (1993, April). Collaboration and change in mathematics teachers' professional beliefs: A report of a four-year longitudinal study. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

3. Evaluation Case Studies

Davis, K. S. (1995, April). Implementation of curricular reform in science education and the process of teacher learning. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Fraivillig, J. L. (1995, April). Advancing children's mathematical thinking: A case study of an expert teacher. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Hasseler, S. S. (1995, April). Missing links: The complexities of supporting teacher learning in school contexts. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Reineke, J. W. (1993). Making connections: Talking and learning in a fourth-grade class. Elementary Subjects Center Series No. 89. East Lansing, MI: Center for the Learning and Teaching of Elementary Subjects. (ERIC Document Reproduction Service No. ED 365 537)

Stake, R., & Migotsky, C. (1995, April). Methods and findings of the CIRCE internal evaluation study (Teacher's Academy for Mathematics and Science). Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Stake, R., Raths, J., St. John, M., Trumbull, D., Jenness, D., Foster, M., Sullivan, S., Denny, T., & Easley, J. (1993). Teacher preparation archives: Case studies of NSF-funded middle school science and mathematics teacher preparation projects. Urbana, IL: University of Illinois, Center for Instructional Research and Curriculum Evaluation.

C. Classroom Discourse Analysis

Adams, V. M. (1993). Teacher talk: Cognitive goals inferred from instruction. Paper presented at the annual meeting of the National Council of Teachers of Mathematics, Seattle, WA. (ERIC Document Reproduction Service NO. ED 364 432)

Carlsen, W. S. (1991). Saying what you know in the biology laboratory. Teaching Education, 3, 17-29.

Carlsen, W. S. (1993). Teacher knowledge and discourse control: Quantitative evidence from novice biology teachers' classrooms. Journal of Research in Science Teaching, 30, 471-481.

Carpenter, T. P., Levi, L. W., Fennema, E., Ansell, E., & Franke, M. L. (1995, April). Discussing alternative strategies as a context for developing understanding in primary grade mathematics classrooms. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Cazden, C. B. (1986). Classroom Discourse. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd. Ed.) (pp. 432-463). New York: MacMillan.

Cobb, P., Wood, T., & Yackel, E. (1990). Classrooms as learning environments for teachers and researchers. In R. B. Davis, C. A. Maher, & N. Noddings (Eds.), Constructivist views on the teaching and learning of mathematics. Monograph number 4 (pp. 125-145). Reston: VA.

Dagher, Z., & Crossman, G. (1992). Verbal explanations given by science teachers: Their nature and implications. Journal of Research in Science Teaching, 29, 361-374.

Duschel, R., & Petasis, L. L. (1995, April). Discourse analysis as a window into the classroom and into the minds of students. Paper presented at the National Association for Research in Science Teaching Conference, San Francisco, CA.

Groisman, A., Shapiro, B., & Willinsky, J. (1991). The potential of semiotics to inform understanding of events in science education. International Journal of Science Education, 13, 217-226.

Kempa, R. F., & Aminah, A. (1991). Learning interactions in group work in science. International Journal of Science Education, 13, 341-354.

Lemke, J. L. (1990). Talking science: Language learning and values. Norwood, NJ: Ablex.

Rafal, C. T. (1995, April). Discourse patterns, pedagogical work and differential participation: A case study drawn from sixth-grade science lessons. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Rafal, C. T., & Gitomer, D. (1995, April). Helping students constrain meaningful problems: Prospects of assessment conversations. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Reddy, M. (1995, April). Becoming second grade scientists: Teaching and learning in science discussions. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Webb, N. M. (1991). Task-related verbal interaction and mathematics learning in small groups. Journal for Research in Mathematics Education, 22, 366-389.

Yackel, E., Cobb, P., & Wood, T. (1991). Small-group interactions as a source of learning opportunities in second-grade mathematics. Journal for Research in Mathematics Education, 22, 390-408.

D Classroom Observation Tools

Artzt, A. F., & Armour-Thomas, E. (1995). A model for studying the relationship between instructional practice and teacher cognition. Manuscript submitted for publication.

Forman, E., Stein, M. K., Brown, C., & Larreamendy-Joerns, J. (1995, April). The socialization of mathematics thinking: The role of institutional, interpersonal, and discursive contexts. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Mitchell, J., & Williams, S. E. (1993, April). Expert/novice differences in teaching with technology. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

Powell, F. J., & Marsh, D. D. (1995, April). Critical factors that undergird teachers' change in science knowledge and pedagogy. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Smithson, J. L., & Porter, A. C. (1993, April). Measuring classroom practice: Lessons learned from efforts to describe the enacted curriculum - The Reform-Up-Close study. Paper presented at the Annual Meeting of the American Educational Research Association, Atlanta, GA.

Young, M. J., Brett, B., Squires, S., & Lemire, N. (1995, April). Symposium: A new observation tool for looking at inquiry-based teaching and learning. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

E Beliefs and Knowledge

1 Teacher beliefs

Abell, S. K., & Roth, M. (1992). Constraints to teaching elementary science: A case study of a science enthusiast student teacher. Science Teacher Education, 76, 581-595.

Clark, C. M., & Peterson, P. L. (1986). Teachers thought processes. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd. Ed) (pp. 225-296). New York: MacMillan.

Cronin-Jones, L., & Shaw, E. L. (1992). The influence of methods instruction on the beliefs of preservice elementary and secondary science teachers: Preliminary comparative analyses. School Science and Mathematics, 92, 14-22.

de Santa Ana, T. M., & Rueda, R. (1995, April). A case-study examination of conflicting mathematics and literacy theories of learning among practicing teachers. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Fennema, E., & Franke, M. L. (1992). Teachers' knowledge and its impact. In D. A. Grouws (Ed.), Handbook of research on mathematics teaching and learning (pp. 147-164). New York: MacMillan.

Hewson, P. W. (1995, April). Tacit knowledge in the conceptions of teaching science and knowledge-in-action of experienced high school science teachers. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Kennedy, M. M., Ball, D. L., & McDiarmid, G. W. (1993). A study package for examining and tracking changes in teachers' knowledge. Technical series 93-1. East Lansing, MI: National Center for Research in Teacher Education.

Kenney, P. A., & Grover, B. W. (1995, April). Preservice teachers' evaluation of students' responses to open-ended mathematics tasks. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Knapp, N., & Peterson, P. L. (Eds.) (1991). What does CGI mean to you? Teachers' ideas of a research-based intervention four years later. Elementary Subject Center Series, No. 48. East Lansing, MI: Center for the Learning and Teaching of Elementary subjects. (ERIC Document Reproduction Service No. ED 341 550)

Knapp, N. F., & Peterson, P. L. (1995). Teachers' Interpretations of "CGI" after four years: Meanings and practices. Journal for Research in Mathematics Education, 26, 40-65.

Lythcott, J. (1991). The nature of essential knowledge bases for science teachers. Teaching Education, 3, 41-55.

Middleton, J. A., Pitman, A., & Webb, N. L. (1993, April). Collaboration and change in mathematics teachers' professional beliefs: A report of a four-year longitudinal study. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

Peterson, P. L., Putnam, R. T., Vredevoogd, J., & Reineke, J. W. (1991). Profiles of practice: Elementary school teachers' views of their mathematics teaching. Elementary Subjects Center Series, No. 39. East Lansing, MI: Center for the Learning and Teaching of Elementary Subjects. (ERIC Document Reproduction Service No. ED 341 546)

Pomeroy, D. (1993). Implications of teachers' beliefs about the nature of science: Comparison of the beliefs of scientists, secondary science teachers, and elementary teachers. Science Education, 77, 261-278.

Sanders, A. B., & Meloth, M. S. (1995, April). Can staff development approaches affect teachers' beliefs? What happened when we tried. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Schifter, D., & Bastable, V. (1995, April). From the teachers' seminar to the classroom: The relationship between doing and teaching mathematics, An example from fractions. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Stecher, B. M., & Mitchell, K. J. (1995, April). Vermont teachers' understanding of mathematical problem solving and "good" math problems. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Thompson, A. (1992). Teachers' beliefs and conceptions: A synthesis of the research. In D. A. Grouws (Ed.), Handbook of research on mathematics teaching and learning (3rd. Ed.) (pp. 127-146). New York: MacMillan.

Thompson, P. W., & Thompson, A. G. (1994). Talking about rates conceptually, Part I: A teacher's struggle. Journal for Research in Mathematics Education, 25, 279-303.

2 Student Beliefs

De Corte, E., Verschaffel, L., & Lasure, S. (1995, April). Word problems: Game or reality? Studies of children's beliefs about the role of real-world knowledge in mathematical modeling. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Griffiths, A., & Barry, M. (1993). High school students' views about the nature of science. School Science and Mathematics, 93, 35-37.

Lo, J. J., Wheatley, G. H., & Smith, A. C. (1994). The participation, beliefs, and development of arithmetic meaning of a third-grade student mathematics class discussion. Journal for Research in Mathematics Education, 25, 30-49.

Ruthven, K., & Coe, R. (1994). A structural analysis of students' epistemic views. Educational Studies in Mathematics, 27, 101-109.

Zucker, A. A., & Esty, E. (1993, April). Promoting discourse in mathematics classrooms using a new video series for middle schools. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

F. Assessment

1. Teacher Assessment

Estes, G. D., Stansbury, K., & Long, C. (1990). Assessment component of the California new teacher project: First year report. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Estes, G. D., Stansbury, K., Long, C., Wolf, K., & Lichtenstein, G. (1992). Assessment component of the California new teacher project: Second year report. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Evertson, C. M., & Green, J. L. (1986). Observation as inquiry and method. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd. Ed) (pp. 162-213). New York: MacMillan.

Hadfield, O. D., Housner, L., & Gomez, R. (1995, April). Conceptual mapping and simulated teaching episodes as indicators of competence in teaching elementary mathematics. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Huang, S., & Waxman, H. (1992, April). Stability of teachers' classroom instruction across classes and time of observation. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Izu, J. A., Long, C., Stansbury, K., & Tierney, D. (1992). Assessment component of the California new teacher project: Evaluation of existing teacher assessment practices. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Kenney, P. A., & Grover, B. W. (1995, April). Preservice teachers' evaluation of students' responses to open-ended mathematics tasks. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Koehler, M., & Grouws, D. A. (1992). Mathematics teaching practices and their effects. In D. A. Grouws (Ed.), Handbook of research on mathematics teaching and learning (pp. 115-126). New York: MacMillan.

Little, J. W. (1993). Teachers' professional development in a climate of educational reform. Educational Evaluation and Policy Analysis, 15, 129-151.

Lomask, M. S., Pecheone, R. L., & Baron, J. B. (1995, March). Assessing new science teachers. Educational Leadership, 52, 62-65.

McMullen, B. G. (1993). Quantitative analysis of effects in the classrooms. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA. (ERIC Document Reproduction Service No. ED 358 116)

Schifter, D., & Simon, M. A. (1992). Assessing teachers' development of a constructivist view of mathematics learning. Teaching & Teacher Education, 8, 187-197.

Shavelson, R. J., Webb, N. M., & Burstein, L. (1986). Measurement of teaching. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd. Ed) (pp. 50-91). New York: MacMillan.

Sherin, M. G. (1995, April). Teachers' content knowledge viewed across contexts. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Simon, M. A., & Schifter, D. (1993). Toward a constructivist perspective: The impact of a mathematics teacher inservice program on students. Educational Studies in Mathematics, 25, 331-340.

Stansbury, K., & Long, C. (1992). Assessment component of the California new teacher project: Framework of knowledge, skills and abilities for beginning teachers in California - A work in progress. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Stansbury, K., & Long, C. (1992). Assessment component of the California new teacher project: Summary evaluations of innovative assessment methods. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Tierney, D., Long, C., Quellmalz, E., Stansbury, K., & Estes, G. (1992). Assessment component of the California new teacher project: Alternative models of new teacher assessment and support. San Francisco, CA: Far West Laboratory for Educational Research and Development.

U. S. Department of Education (1995, Winter). Assessing accomplished teaching. The ERIC Review, 3, 14-15. Washington, DC: Author.

2 Student Assessment

Bergman, A. B. (1993). Performance assessment for early childhood: What could be more natural? Science and Children, 30, 20-22.

Davis, G. E. (1989). Children talking about children's mathematics. Mathematics Education Research Journal, 1, 35-42.

Doran, R. L. (1995, April). Alternative assessment in science, New York style. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Doran, R. L., Boorman, J., Chan, F., & Hejaily, N. (1993). Authentic assessment: An instrument for consistency. Science Teacher, 60, 36-41.

Gitomer, D. H., & Duschl, R. A. (1995). Moving toward a portfolio culture in science education. Princeton, NJ: Center for Performance Assessment, ETS.

Greig, J., Wise, N., & Lomask, M. (1995, April). The development of an assessment of scientific experimentation proficiency for Connecticut's statewide testing program. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Hamilton, L. S., Nussbaum, M., Kupermintz, H., Kerkhoven, J. I., & Snow, R. E. (1995). Enhancing the validity and usefulness of large-scale educational assessments: II. NELS 88 Science achievement. American Educational Research Journal, 32, 555-582.

Hamilton, L. S., Nussbaum, E. M., & Snow, R. E. (1995, April). Interview procedures for validating science assessments. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Jackson, S. L., Stratford, S. J., Krajcik, J., & Soloway, E. (1995, April). Learner-centered software design to support students building models. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Koretz, D., Stecher, B., Klein, S., McCaffrey, D., & Deibert, E. (1992). Can portfolios assess student performance and influence instruction? The 1991-92 Vermont experience. Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing. (ERIC Document Reproduction Service No. ED 365 699)

Kupermintz, H., Ennis, M. M., Hamilton, L. S., Talbert, J. E., & Snow, R. E. (1995). Enhancing the validity and usefulness of large-scale educational assessments: I. NELS 88 Mathematics achievement. American Educational Research Journal, 32, 525-554.

Lapointe, A. E., Mead, N. A., & Askew, J. M. (1992). Learning mathematics. Princeton, NJ: Educational Testing Service. (ERIC Document Reproduction Service No. ED 347 081)

Leach, J., Driver, R., Millar, R., & Scott, P. (1993). Progression in learning about 'the nature of science': Issues of conceptualization and methodology. Paper presented for the annual meeting of the British Educational Research Association, Liverpool, England. (ERIC Document Reproduction Service No. ED 368 54)

Leder, G. C. (Ed.) (1992). Assessment and learning of mathematics. Victoria, Australia: The Australian Council for Educational Research.

Lomask, M. S., Baron, J. B., & Greig, J. (1995, April). Large-scale science performance assessment in Connecticut: Challenges and resolutions. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Romberg, T. A. (Ed.) (1992). Mathematics assessment and evaluation: Imperatives for mathematics educators. Albany, NY: SUNY Press.

Roth, W. M., & Roychoudhury, A. (1992). The social construction of scientific concepts or the concept map as conscription device and tool for social thinking in high school science. Science Education, 76, 531-557.

Ruiz-Primo, M. A., & Shavelson, R. J. (1995, April). Concept maps as potential alternative assessments in science. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Schauble, L., & Lopfer, L. E. (1991). Students' transition from an engineering model to a science model of experimentation. Journal of Research in Science Teaching, 28, 859-882.

Suzuki, K., & Harnisch, D. L. (1995, April). Measuring cognitive complexity: An analysis of performance-based assessment in mathematics. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Williams, C. G. (1995, April). Concept maps as research tools in mathematics. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Winograd, K. (1992). What fifth graders learn when they write their own problems. Educational Leadership, 49, 64-67.

Winograd, K. (1993). Selected writing behaviors of fifth graders as they composed original mathematics story problems. Research in the Teaching of English, 27, 369-394.

Yackel, E., & Cobb, P. (1992). Instructional development and assessment from a socioconstructivist perspective. In G. C. Leder (Ed.), Assessment and Learning of Mathematics (pp. 63-82). Victoria, Australia: The Australian Council for Educational Research.

3 Teacher Assessment Practice

Leder, G. C. (Ed.) (1992). Assessment and Learning of Mathematics. Victoria, Australia: The Australian Council for Educational Research.

National Council of Teachers of Mathematics (1995). Assessment Standards for School Mathematics. Reston, VA: Author.

Niss, M. (Ed.) (1993). Investigations into assessment in mathematics education. Dordrecht, The Netherlands: Kluwer.

Niss, M. (Ed.) (1993). Cases of assessment in mathematics education: An ICMI study. Dordrecht, The Netherlands: Kluwer.

Oosterhof, A. (1995, April). An extended observation of assessment procedures used by selected public school teachers. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Telese, J. A. (1993). Effects of alternative assessment from the student's view. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA. (ERIC Document Reproduction Service No. ED 361 378)

Van Den Heuvel-Panhuizen, M. (1994). Improvement of (didactic) assessment by improvement of problems: An attempt with respect to percentage. Educational Studies in Mathematics, 27, 341-372.

Zucker, A. A., & Esty, E. (1993). Promoting discourse in mathematics classrooms using a new video series for middle schools. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

BIBLIOGRAPHY LISTING BY AUTHOR--ALPHABETICAL

Abell, S. K., & Roth, M. (1992). Constraints to teaching elementary science: A case study of a science enthusiast student teacher. Science Teacher Education, 76, 581-595.

ABT Associates (1993). A study of NSF Teacher Enhancement Program (TEP) participants and principal investigators: 1984-1989. Volume II: Technical report. Cambridge, MA: Author. (ERIC Document Reproduction Service No. ED 372 027)

Adams, V. M. (1993). Teacher talk: Cognitive goals inferred from instruction. Paper presented at the annual meeting of the National Council of Teachers of Mathematics, Seattle, WA. (ERIC Document Reproduction Service NO. ED 364 432)

Altschuld, J. W., & Kumar, D. (1995). Program evaluation in science education: The model perspective. New Directions for Program Evaluation, 65, 5-17.

Artzt, A. F., & Armour-Thomas, E. (1995). A model for studying the relationship between instructional practice and teacher cognition. Manuscript submitted for publication.

Bearden, D., Bembry, K., & Babu, S. (1995, April). Effective schools: Is there a winning combination of administrators, teachers and students? Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Bergman, A. B. (1993). Performance assessment for early childhood: What could be more natural? Science and Children, 30, 20-22.

Blume, B. W., & Nicely, R. F. (Eds.) (1991). A guide for reviewing school mathematics programs. Reston: VA: National Council of Teachers of Mathematics. (ERIC Document Reproduction Service ED 339 597)

Carlsen, W. S. (1991). Saying what you know in the biology laboratory. Teaching Education, 3, 17-29.

Carlsen, W. S. (1993). Teacher knowledge and discourse control: Quantitative evidence from novice biology teachers' classrooms. Journal of Research in Science Teaching, 30, 471-481.

Carpenter, T. P., Levi, L. W., Fennema, E., Ansell, E., & Franke, M. L. (1995, April). Discussing alternative strategies as a context for developing understanding in primary grade mathematics classrooms. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Cazden, C. B. (1986). Classroom Discourse. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd. Ed.) (pp. 432-463). New York: MacMillan.

Clark, C. M., & Peterson, P. L. (1986). Teachers thought processes. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd. Ed.) (pp. 225-296). New York: MacMillan.

Cobb, P., Wood, T., & Yackel, E. (1990). Classrooms as learning environments for teachers and researchers. In R. B. Davis, C. A. Maher, & N. Noddings (Eds.), Constructivist views on the teaching and learning of mathematics. Monograph number 4 (pp. 125-145). Reston VA.

Cobb, P., Wood, T., Yackel, E., & Perlwitz, M. (1992). A follow-up assessment of a second-grade problem-centered mathematics project. Educational Studies in Mathematics, 23, 483-504.

Cobb, P., & Yackel, E. (1995, April). A constructivist perspective on the culture of the mathematics classroom. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Cohen, M. R., & Harper, E. T. (1991). Student-as-scientist and scientist-as-student: Changing models for learning from experience. Teaching Education, 3, 31-40.

Cronin-Jones, L., & Shaw, E. L. (1992). The influence of methods instruction on the beliefs of preservice elementary and secondary science teachers: Preliminary comparative analyses. School Science and Mathematics, 92, 14-22.

Dagher, Z., & Crossman, G. (1992). Verbal explanations given by science teachers: Their nature and implications. Journal of Research in Science Teaching, 29, 361-374.

Davis, G. E. (1989). Children talking about children's mathematics. Mathematics Education Research Journal, 1, 35-42.

Davis, K. S. (1995, April). Implementation of curricular reform in science education and the process of teacher learning. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Davis, R. B. (1994). The task of improving mathematics classrooms: A reply to Schofield, Eurich-Fulcer, and Britt. American Educational Research Journal, 31(3), 608-618.

De Corte, E., Verschaffel, L., & Lasure, S. (1995, April). Word problems: Game or reality? Studies of children's beliefs about the role of real-world knowledge in mathematical modeling. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

de Santa Ana, T. M., & Rueda, R. (1995, April). A case-study examination of conflicting mathematics and literacy theories of learning among practicing teachers. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Doolittle, G. (1995, April). How seventh and eighth grade students experience hands-on science in the urban core. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Doran, R. L. (1995, April). Alternative assessment in science, New York style. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Doran, R. L., Boorman, J., Chan, F., & Hejaily, N. (1993). Authentic assessment: An instrument for consistency. Science Teacher, 60, 36-41.

Duschel, R., & Petasis, L. L. (1995, April). Discourse analysis as a window into the classroom and into the minds of students. Paper presented at the National Association for Research in Science Teaching Conference, San Francisco, CA.

Estes, G. D., Stansbury, K., & Long, C. (1990). Assessment component of the California new teacher project: First year report. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Evertson, C. M., & Green, J. L. (1986). Observation as inquiry and method. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd. Ed) (pp. 162-213). New York: MacMillan.

Falmagne, J. C., Doignon, J. P., Koppen, M., Villano, M., & Johannesen, L. (1990) Introduction to knowledge spaces: How to build, test, and search them. Psychological Review, 97, 201-224.

Fennema, E., & Franke, M. L. (1992). Teachers' knowledge and its impact. In D. A. Grouws (Ed.), Handbook of research on mathematics teaching and learning (pp. 147-164). New York: MacMillan.

Forman, E., Stein, M. K., Brown, C., & Larreamendy-Joerns, J. (1995, April). The socialization of mathematics thinking: The role of institutional, interpersonal, and discursive contexts. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Fraivillig, J. L. (1995, April). Advancing children's mathematical thinking: A case study of an expert teacher. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Frechtling, J. A. (1995). Footprints: strategies for non-traditional program evaluation. Rockville, MD: Westat.

Freeman, J. G., Kelly, B. A., & Marx, R. W. (1995, April). Helping teachers adopt a constructivist approach to teaching science. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Gitomer, D. H., & Duschl, R. A. (1995). Moving toward a portfolio culture in science education. Princeton, NJ: Center for Performance Assessment, ETS.

Goldsmith, L. T., & Davenport, L. R. (1995, April). Affective issues in developing mathematics teaching practice. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Greig, J., Wise, N., & Lomask, M. (1995, April). The development of an assessment of scientific experimentation proficiency for Connecticut's statewide testing program. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Griffiths, A., & Barry, M. (1993). High school students' views about the nature of science. School Science and Mathematics, 93, 35-37.

Groisman, A., Shapiro, B., & Willinsky, J. (1991). The potential of semiotics to inform understanding of events in science education. International Journal of Science Education, 13, 217-226.

Hadfield, O. D., Housner, L., & Gomez, R. (1995, April). Conceptual mapping and simulated teaching episodes as indicators of competence in teaching elementary mathematics. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Hamilton, L. S., Nussbaum, E. M., & Snow, R. E. (1995, April). Interview procedures for validating science assessments. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Hamilton, L. S., Nussbaum, M., Kupermintz, H., Kerkhoven, J. I., & Snow, R. E. (1995). Enhancing the validity and usefulness of large-scale educational assessments: II. NELS:88 Science achievement. American Educational Research Journal, 32, 555-582.

Hasseler, S. S. (1995, April). Missing links: The complexities of supporting teacher learning in school contexts. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Hewson, P. W. (1995, April). Tacit knowledge in the conceptions of teaching science and knowledge-in-action of experienced high school science teachers. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Hojnacki, S. K., & Grover, B. W. (1992, April). Thinking mathematics: What's in it for the students? Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Huang, S., & Waxman, H. (1992, April). Stability of teachers' classroom instruction across classes and time of observation. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Izu, J. A., Long, C., Stansbury, K., & Tierney, D. (1992). Assessment component of the California new teacher project: Evaluation of existing teacher assessment practices. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Jackson, S. L., Stratford, S. J., Krajcik, J., & Soloway, E. (1995, April). Learner-centered software design to support students building models. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Kagan, D. M. (1990). Ways of evaluating teacher cognition: Inferences concerning the Goldilocks Principle. Review of Educational Research, 60, 419-470.

Kempa, R. F., & Aminah, A. (1991). Learning interactions in group work in science. International Journal of Science Education, 13, 341-354.

Kennedy, M. M., Ball, D. L., & McDiarmid, G. W. (1993). A study package for examining and tracking changes in teachers' knowledge. Technical series 93-1. East Lansing, MI: National Center for Research in Teacher Education.

Kenney, P. A., & Grover, B. W. (1995, April). Preservice teachers' evaluation of students' responses to open-ended mathematics tasks. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Kilgore, S. B., & Pendleton, W. W. (1993). The organizational context of learning: Framework for understanding the acquisition of knowledge. Sociology of Education, 66, 63-87.

Kinnear, J. (1994). What science education really says about communication of science concepts. Paper presented at the International Communication Association Conference, Sydney, Australia. (ERIC Document Reproduction Service No. ED 372 455)

Kirkpatrick, N., Tullis, R. J., Sanchez, K. S., & Gonzalez, J. (1991). 1990-91 HISD Magnet Evaluation: Science, math, and computer enrichment programs. Houston, TX: Houston Independent School District, Research & Evaluation Office. (ERIC Document Reproduction Service ED 347 068)

Knapp, N., & Peterson, P. L. (Eds.) (1991). What does CGI mean to you? Teachers' ideas of a research-based intervention four years later. Elementary Subject Center Series, No. 48. East Lansing, MI: Center for the Learning and Teaching of Elementary subjects. (ERIC Document Reproduction Service No. ED 341 550)

Knapp, N., & Peterson, P. L. (Eds.) (1993). Understanding learners' understandings. Elementary Subjects Center Series No. 97. East Lansing, MI: Center for the Learning and Teaching of Elementary subjects. (ERIC Document Reproduction Service ED 356 900)

Knapp, N. F., & Peterson, P. L. (1995). Teachers' Interpretations of "CGI" after four years: Meanings and practices. Journal for Research in Mathematics Education, 26, 40-65.

Koehler, M., & Grouws, D. A. (1992). Mathematics teaching practices and their effects. In D. A. Grouws (Ed.), Handbook of research on mathematics teaching and learning (pp. 115-126). New York: MacMillan.

Koretz, D., & Stecher, B., Klein, S., McCaffrey, D., & Deibert, E. (1992). Can portfolios assess student performance and influence instruction? The 1991-92 Vermont experience. Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing. (ERIC Document Reproduction Service No. ED 365 699)

Kupermintz, H., Ennis, M. M., Hamilton, L. S., Talbert, J. E., & Snow, R. E. (1995). Enhancing the validity and usefulness of large-scale educational assessments: I. NELS 88 Mathematics achievement. American Educational Research Journal, 32, 525-554.

Lapointe, A. E., Mead, N. A., & Askew, J. M. (1992). Learning mathematics. Princeton, NJ: Educational Testing Service. (ERIC Document Reproduction Service No. ED 347 081)

Leach, J., Driver, R., Millar, R., & Scott, P. (1993). Progression in learning about 'the nature of science': Issues of conceptualization and methodology. Paper presented for the annual meeting of the British Educational Research Association, Liverpool, England. (ERIC Document Reproduction Service No. ED 368 54)

Leder, G. C. (Ed.) (1992). Assessment and learning of mathematics. Victoria, Australia: The Australian Council for Educational Research.

Lemke, J. L. (1990). Talking science: Language learning and values. Norwood, NJ: Ablex.

Lewin, A. (1992). The Shell Science Center: In Inset 1990. Durban, South Africa: The Shell Science and Mathematics Resource Centre Education Trust.

Little, J. W. (1993). Teachers' professional development in a climate of educational reform. Educational Evaluation and Policy Analysis, 15, 129-151.

Lo, J. J., Wheatley, G. H., & Smith, A. C. (1994). The participation, beliefs, and development of arithmetic meaning of a third-grade student mathematics class discussion. Journal for Research in Mathematics Education, 25, 30-49.

Lomask, M. S., Baron, J. B., & Greig, J. (1995, April). Large-scale science performance assessment in Connecticut: Challenges and resolutions. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Lomask, M. S., Pecheone, R. L., & Baron, J. B. (1995, March). Assessing new science teachers. Educational Leadership, 52, 62-65.

Lythcott, J. (1991). The nature of essential knowledge bases for science teachers. Teaching Education, 3, 41-55.

Machiels-Bongaerts, M., & Schmidt, H. G. (1995). The relation between the nature of prior knowledge activated and information processing: To elaborate or to infer? Unpublished manuscript. Maastricht, The Netherlands: Universitaire Pers Maastricht.

McMullen, B. G. (1993). Quantitative analysis of effects in the classrooms. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA. (ERIC Document Reproduction Service No. ED 358 116)

Middleton, J. A., Pitman, A., & Webb, N. L. (1993, April). Collaboration and change in mathematics teachers' professional beliefs: A report of a four-year longitudinal study. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

Mitchell, I. (1994). School-tertiary collaboration: A long-term review. International Journal of Science Education, 16, 599-612.

Mitchell, J., & Williams, S. E. (1993, April). Expert/novice differences in teaching with technology. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

National Academy Press (1994, November). National science education standards (DRAFT). Washington, DC: Author.

National Council of Teachers of Mathematics (1989). Curriculum and evaluation standards for school mathematics. Reston, VA: Author.

National Council of Teachers of Mathematics (1991). Professional standards for teaching mathematics. Reston, VA: Author.

National Council of Teachers of Mathematics (1995). Assessment standards for school mathematics. Reston, VA: Author.

Niss, M. (Ed.) (1993). Cases of assessment in mathematics education: An ICMI study. Dordrecht, The Netherlands: Kluwer.

O'Sullivan, R. (Ed.) (1995). Emerging roles of evaluation in science education reform (whole issue). New directions for program evaluation, 65.

Oosterhof, A. (1995, April). An extended observation of assessment procedures used by selected public school teachers. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Page, R. (1995). Who systematizes the systematizers? Policy and practice interactions in a case of state-level systemic reform. Theory into Practice, 34, 21-29.

Peterson, P. L., & Fennema, E. (1991, October). Mathematics teaching and learning: Researching in well-defined mathematical domains. Elementary Subjects Center Series No. 40. Proceedings of a Conference held at Michigan State University, East Lansing, MI. The Center for the Learning and Teaching of Elementary Subjects, Institute for Research on Teaching.

Peterson, P. L., Putnam, R. T., Vredevoogd, J., & Reineke, J. W. (1991). Profiles of practice: Elementary school teachers' views of their mathematics teaching. Elementary Subjects Center Series, No. 39. East Lansing, MI: Center for the Learning and Teaching of Elementary Subjects. (ERIC Document Reproduction Service No. ED 341 546)

Pomeroy, D. (1993). Implications of teachers' beliefs about the nature of science: Comparison of the beliefs of scientists, secondary science teachers, and elementary teachers. Science Education, 77, 261-278.

Porter, A. (1993, May). Defining and measuring opportunity-to-learn. Paper prepared for the National Governors' Association. Madison, WI: Center for Policy Research in Education and the Wisconsin Center for Education Research.

Porter, A. (1994, May). The uses and misuses of opportunity-to-learn standards. Paper presented at a Brookings Institution conference, Beyond Goals 2000: The Future of National Standards and Assessment in American Education, Washington, DC.

Porter, A. C. (1995, April). Standard setting and the reform of high school mathematics and science (DRAFT). Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Porter, A. C., Smithson, J., & Osthoff, E. (1994). Standard setting as a strategy for upgrading high school mathematics and science. The governance of curriculum: The 1994 ASCD Yearbook (pp. 138-166). Alexandria, VA: Association for Supervision and Curriculum Development.

Powell, F. J., & Marsh, D. D. (1995, April). Critical factors that undergird teachers' change in science knowledge and pedagogy. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Rafal, C. T. (1995, April). Discourse patterns, pedagogical work and differential participation: A case study drawn from sixth-grade science lessons. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Rafal, C. T., & Gitomer, D. (1995, April). Helping students constrain meaningful problems: Prospects of assessment conversations. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Reddy, M. (1995, April). Becoming second grade scientists: Teaching and learning in science discussions. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Reineke, J. W. (1993). Making connections: Talking and learning in a fourth-grade class. Elementary Subjects Center Series No. 89. East Lansing, MI: Center for the Learning and Teaching of Elementary Subjects. (ERIC Document Reproduction Service No. ED 365 537)

Romberg, T. A. (Ed.) (1992). Mathematics assessment and evaluation: Imperatives for mathematics educators. Albany, NY: SUNY Press.

Roth, W. M., & Roychoudhury, A. (1992). The social construction of scientific concepts or the concept map as conscription device and tool for social thinking in high school science. Science Education, 76, 531-557.

Ruiz-Primo, M. A., & Shavelson, R. J. (1995, April). Concept maps as potential alternative assessments in science. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Ruthven, K., & Coe, R. (1994). A structural analysis of students' epistemic views. Educational Studies in Mathematics, 27, 101-109.

Sanders, A. B., & Meloth, M. S. (1995, April). Can staff development approaches affect teachers' beliefs? What happened when we tried. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Schauble, L., & Lopfer, L. E. (1991). Students' transition from an engineering model to a science model of experimentation. Journal of Research in Science Teaching, 28, 859-882.

Schifter, D., & Bastable, V. (1995, April). From the teachers' seminar to the classroom: The relationship between doing and teaching mathematics, An example from fractions. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Schifter, D., & Simon, M. A. (1992). Assessing teachers' development of a constructivist view of mathematics learning. Teaching & Teacher Education, 8, 187-197.

Schofield, J. W., Eurich-Fulcer, R., & Britt, C. L. (1994). Teachers, computer tutors, and teaching: The artificially intelligent tutor as an agent for classroom change. American Educational Research Journal, 31, 579-607.

Shavelson, R. J., Webb, N. M., & Burstein, L. (1986). Measurement of teaching. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd. Ed.) (pp. 50-91). New York: MacMillan.

Sherin, M. G. (1995, April). Teachers' content knowledge viewed across contexts. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Simon, M. A. (1994). Learning mathematics and learning to teach: Learning cycles in mathematics teacher education. Educational Studies in Mathematics, 26, 71-94.

Simon, M. A. (1995a). Elaborating models of mathematics teaching: A response to Steffe and D'Ambrosio. Journal for Research in Mathematics Education, 26, 160-162.

Simon, M. A. (1995b). Reconstructing mathematics pedagogy from a constructivist perspective. Journal for Research in Mathematics Education, 26, 114-145.

Simon, M. A., & Schifter, D. (1993). Toward a constructivist perspective: The impact of a mathematics teacher inservice program on students. Educational Studies in Mathematics, 25, 331-340.

Smithson, J. L., & Porter, A. C. (1993, April). Measuring classroom practice: Lessons learned from efforts to describe the enacted curriculum - The Reform-Up-Close study. Paper presented at the Annual meeting of the American Educational Research Association, Atlanta, GA.

Smithson, J. L., Porter, A. C., & Blank, R. K. (1995, May). Describing the enacted curriculum: Development and dissemination of opportunity to learn indicators in science education. Washington, DC: Council of Chief State School Officers.

Stake, R., & Migotsky, C. (1995, April). Methods and findings of the CIRCE internal evaluation study (Teacher's Academy for Mathematics and Science). Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Stake, R., Raths, J., St. John, M., Trumbull, D., Jenness, D., Foster, M., Sullivan, S., Denny, T., & Easley, J. (1993). Teacher preparation archives: Case studies of NSF-funded middle school science and mathematics teacher preparation projects. Urbana, IL: University of Illinois, Center for Instructional Research and Curriculum Evaluation.

Stansbury, K., & Long, C. (1992). Assessment component of the California new teacher project. Framework of knowledge, skills and abilities for beginning teachers in California - A work in progress. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Stecher, B. M., & Mitchell, K. J. (1995, April). Vermont teachers' understanding of mathematical problem solving and "good" math problems. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Steffe, L. P., & D'Ambrosio (1995). Toward a working model of constructivist teaching: A reaction to Simon. Journal for Research in Mathematics Education, 26, 146-159.

Stocks, J. E., & Schofield, J. W. (in press). Educational reform and professional development. In E. Fennema & B. S. Nelson (Eds.), Teachers in transition.

Suzuki, K., & Harnisch, D. L. (1995, April). Measuring cognitive complexity: An analysis of performance-based assessment in mathematics. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Telese, J. A. (1993). Effects of alternative assessment from the student's view. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA. (ERIC Document Reproduction Service No. ED 361 378)

Thompson, A. (1992). Teachers' beliefs and conceptions: A synthesis of the research. In D. A. Grouws (Ed.), Handbook of research on mathematics teaching and learning (3rd. Ed.) (pp. 127-146). New York: MacMillan.

Thompson, P. W., & Thompson, A. G. (1994). Talking about rates conceptually, Part I: A teacher's struggle. Journal for Research in Mathematics Education, 25, 279-303.

Tierney, D., Long, C., Quellmalz, E., Stansbury, K., & Estes, G. (1992). Assessment component of the California new teacher project. Alternative models of new teacher assessment and support. San Francisco, CA: Far West Laboratory for Educational Research and Development.

U. S. Department of Education (1995, Winter). Assessing accomplished teaching. The ERIC Review, 3, 14-15. Washington, DC: Author.

Van Den Heuvel-Panhuizen, M. (1994). Improvement of (didactic) assessment by improvement of problems: An attempt with respect to percentage. Educational Studies in Mathematics, 27, 341-372.

Webb, N. M. (1991). Task-related verbal interaction and mathematics learning in small groups. Journal for Research in Mathematics Education, 22, 366-389.

Weiss, I. (1993). A profile of science and mathematics education in the United States 1993. Chapel Hill, NC: Horizon Research.

Williams, C. G. (1995, April). Concept maps as research tools in mathematics. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Williams, S. R. (1993). Mathematics and being in the world: Toward an interpretive framework. For the Learning of Mathematics, 13, 2-7.

Winograd, K. (1992). What fifth graders learn when they write their own problems. Educational Leadership, 49, 64-67.

Winograd, K. (1993). Selected writing behaviors of fifth graders as they composed original mathematics story problems. Research in the Teaching of English, 27, 369-394.

Yackel, E., & Cobb, P. (1992). Instructional development and assessment from a socioconstructivist perspective. In G. C. Leder (Ed.), Assessment and learning of mathematics (pp. 63-82). Victoria, Australia: The Australian Council for Educational Research.

Yackel, E., & Cobb, P. (1992). Instructional development and assessment from a socioconstructivist perspective. In G. C. Leder (Ed.), Assessment and Learning of Mathematics (pp. 63-82). Victoria, Australia: The Australian Council for Educational Research.

Yackel, E., Cobb, P., & Wood, T. (1991). Small-group interactions as a source of learning opportunities in second-grade mathematics. Journal for Research in Mathematics Education, 22, 390-408.

Young, M. J., Brett, B., Squires, S., & Lemire, N. (1995, April). Symposium: A new observation tool for looking at inquiry-based teaching and learning. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Zucker, A. A., & Esty, E. (1993, April). Promoting discourse in mathematics classrooms using a new video series for middle schools. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

Zucker, A. A., & Esty, E. (1993, April). Promoting discourse in mathematics classrooms using a new video series for middle schools. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.